

Disclaimer:

This English translation is produced by machine translation and may contain errors. The JPO, the INPIT, and those who drafted this document in the original language are not responsible for the result of the translation.

Notes:

1. Untranslatable words are replaced with asterisks (* **).
2. Texts in the figures are not translated and shown as it is.

Translated: 08:04:40 JST 06/14/2008

Dictionary: Last updated 05/30/2008 / Priority: 1. Manufacturing/Quality / 2. Industrial Products / 3. Mechanical engineering

FULL CONTENTS

[Claim(s)]

[Claim 1] Have the belt die surface which is formed of two or more belt segments divided in the direction of a periphery and in which the diameter of expanding and contracting is possible, and on this belt die surface It is the belt form drum which forms a tubed raw belt by piling up winding and its point, and a termination part for the band-like raw belt material under which the steel cord was laid. [a part] while said point and a termination part have an acute angle shape [of the point of a sword] corner section, and an obtuse angle corner section by carrying out diagonal cut of said raw belt material to a longitudinal direction The wide belt segment from which said two or more belt segments receive said acute angle corner section, including the wide belt segment which receives said obtuse angle corner section, and the belt segment of the narrow width allotted between said wide belt segments, [and said wide belt segment] The belt form drum characterized by carrying out ** arrival of the magnet which adsorbs and holds said steel cord to the radial inner surface.

[Claim 2] The width WA of said wide belt segment is a belt form drum according to claim 1 characterized by being 1.5 to 3.0 times the width WB of the belt segment of said narrow width.

[Claim 3] Said wide belt segment is Claim 1 and the belt form drum of two descriptions which are characterized by performing black surface preparation to the radial outside surface.

[Detailed Description of the Invention]
[0001]

[Field of the Invention] When this invention forms the raw belt of a tire, it relates to the belt molding equipment which can prevent birth of the joint stagger by the point-of-a-sword-like corner at the head of raw belt material falling between belt segments, and accuracy lowering of joint inspection.

[0002]

[Description of the Prior Art] [two or more belt segments a divided in the direction of a periphery] on the belt die surface which is the peripheral face using the belt form drum A held possible [movement] radially when manufacturing a radial-ply tire so that it may sketch in drawing 7 (A) The raw belt B is formed in tubed by winding the band-like raw belt material b.

[0003] On this belt form drum A, in order to bring the belt die surface at the time of diameter expansion close to a perfect circle, it is in the tendency to which form the belt segment a in a narrow width, and that total (the number of division) is made to increase. Moreover, in order to correspond to the raw belt B of plurality size with which diameters differ, it forms, enabling free adjustment, the migration length of diameter expansion, i.e., amount, to a radial direction of the belt segment a.

[0004] On the other hand, develop and so that the belt form drum A and the raw belt B may be sketched in drawing 7 (B) at a flat surface [the raw belt material b] Along with the steel cord (belt), diagonal cut of that point bf and the termination part br is carried out, and they are formed cylindrical by piling up and carrying out the fastener of this point bf and the termination part br. In order to adsorb and hold the raw belt material b to each belt segment a and to make volume attachment easy at this time, Magnet c is embedded on that outside surface.

[0005]

[Problem to be solved by the invention] However, when the amount of diameter expansion becomes large and the interval d of the belt segment a spreads, the point-of-a-sword-like corner b1 of the raw belt material b overflows on the belt segment a conjointly with this belt segment a being a narrow width, and it becomes easy to fall in said interval d. As a result, the point-of-a-sword-like corner b1 carries out position gap, and there is a problem of generating a joint stagger.

[0006] In formation of the **** belt B, joint inspection for measuring or judging the amount of fasteners is conducted. This inspection measures the height variation rate from a belt die surface with a laser displacement meter, and is usually computing the amount of fasteners from the detection position of the point bf of the belt material b and the termination part br which were obtained by this as proposed by JP,H6-23867,A etc. However, it falls and ** also has the problem into the interval d of said point-of-a-sword-like corner b1 of inviting an error to measurement of a height variation rate, and reducing inspection accuracy.

[0007] Furthermore, in the belt segment a of a narrow width, for dimensional restrictions, as shown in drawing 8 , Magnet c is embedded in the crevice a1 prepared in the outside surface, and the surface is hardened with an adhesive bond e, and it is fixing. However, by the chip of an adhesive bond e etc., in this case, it dents on the surface, g arises, and inspection accuracy is similarly reduced to it.

[0008] Then, this invention allots a wide belt segment to each position of the corner section of the shape of the point of a sword in the point of said raw belt material, and an obtuse angle corner section, and is based on moreover carrying out ** arrival of the magnet to the inner

surface of this wide belt segment. It aims at offer of the belt molding equipment which can control the birth of a joint stagger mentioned above, accuracy lowering of joint inspection, etc. [0009]

[Means for solving problem] In order to attain said object, [invention of application-concerned Claim 1] Have the belt die surface which is formed of two or more belt segments divided in the direction of a periphery and in which the diameter of expanding and contracting is possible, and on this belt die surface It is the belt form drum which forms a tubed raw belt object by piling up winding and its point, and a termination part for the band-like raw belt material under which the steel cord was laid. [a part] while said point and a termination part have an acute angle shape [of the point of a sword] corner section, and an obtuse angle corner section by carrying out diagonal cut of said raw belt material to a longitudinal direction The wide belt segment from which said two or more belt segments receive said acute angle corner section, Including the wide belt segment which receives said obtuse angle corner section, and the belt segment of the narrow width allotted between said wide belt segments, [and said wide belt segment] It is characterized by carrying out ** arrival of the magnet which adsorbs and holds said steel cord to the radial inner surface.

[0010] Moreover, in invention of Claim 2, width WA of said wide belt segment is characterized by being 1.5 to 3.0 times the width WB of the belt segment of said narrow width.

[0011] Moreover, in invention of Claim 3, said wide belt segment is characterized by performing black surface preparation to the radial outside surface.

[0012]

[Mode for carrying out the invention] The form of operation of this invention is hereafter explained with the example of a graphic display. The sectional view of the direction of a periphery where drawing 1 sketches the diameter expansion state and diameter reduction state of a belt form drum of this invention, and drawing 2 are the sectional views of the axial center direction including the revolving-shaft alignment J.

[0013] In drawing 1 , the belt form drum 1 is equipped with the pinch-and-swell means 3 to which the diameter of expanding and contracting of the belt die surface S which consists of that outside surface 2S is carried out by moving radially two or more belt segments 2 divided in the direction of a periphery, and this belt segment 2.

[0014] And on the belt die surface S in a diameter expansion state, while the tubed raw belt B is formed by piling up winding, and its Point bf and termination part br in the raw belt material b, removal of this raw belt B is performed in a diameter reduction state.

[0015] In addition, the raw belt material b (shown in drawing 6) receives a longitudinal direction like common knowledge. For example, it is the belt sheet which covered with skimming rubber the steel cord arranged at the include angle theta of 10 to 30 degrees, and the acute angle shape [of the point of a sword] corner section b1 and the obtuse angle corner section b2 are formed in the point bf and the termination part br by carrying out diagonal cut

along with a steel cord.

[0016] Moreover, said belt segment 2 is a long piece object extended to an axial center direction, and the outside surface 2S makes the shape of a straight line in the cross section of an axial center direction in this example. Moreover, in the revolving-shaft alignment J and the right-angled cross section, this outside surface 2S is in a radius of the belt die surface S, abbreviation, etc. in a diameter expansion state by carrying out, and is formed circularly [curvature]. In addition, the above "abbreviation etc. is by carrying out" means permitting this span of adjustable range, although the diameter of the belt die surface S in a diameter expansion state is adjusted according to tire size.

[0017] Next, two or more slide metal fittings 5 by which said pinch-and-swell means 3 attaches a revolving shaft 4 and said belt segment 2 by a radial appearance as shown in drawing 2 , It has the side board 7 which guides one side edge of each slide metal fittings 5 within and without radial through the advice means 6, and two or more operation metal fittings 10 of the shape of a wedge which engages with the radial common-law marriage of each slide metal fittings 7 through the inclined guide means 9, and makes the slide metal fittings 5 move radially by the attitude to an axial center direction. In addition, each operation metal fittings 10 have clung to the sliding fuse-tube 11 extrapolated by said revolving shaft 4 at one.

[0018] Said slide metal fittings 5 are radiately arranged on the surroundings of nothing and said revolving-shaft alignment J in tabular [which attaches said belt segment 2 by a radial appearance].

[0019] Moreover, said side board 7 is fixed to nothing and said revolving shaft 4 really possible [a revolution] in the approximate circle tabular extended on the radial outside from said revolving shaft 4 by the end side (drawing 2 the left end side) of the belt segment 2. This side board 7 guides one side edge (drawing 2 left side end) of said slide metal fittings 5 within and without radial through the advice means 6.

[0020] By this example, this advice means 6 is a linear guide, and is formed from the rail part 16 extended in the shape of a straight line, and the bearing 17 of the letter of a block which can carry out relative displacement along with the rail part 16 by engaging with this rail part 16. In this example, while the rail part 16 is allotted to said one side edge of a right angle and said slide metal fittings 5 to said revolving-shaft alignment J, the case where the bearing 17 is allotted to a sense side among said side boards 7 is illustrated.

[0021] Moreover, the radial rim of the wedge-shaped operation metal fittings 10 really fixed to the operation metal fittings 10 engages with the radial common-law marriage of said slide metal fittings 5 through the inclined guide means 9. This inclined guide means 9 is formed like said advice means 6 of the linear guide which consists of a rail part 16 and a bearing 17. In this drawing, the case where the bearing 17 is allotted to the radial common-law marriage of the slide metal fittings 5, and the rail part 16 is allotted to the radial rim of the operation metal fittings 10 again is illustrated.

[0022] Moreover, said sliding fuse-tube 11 is supported really possible [a revolving shaft 4] for a revolution possible [attitude movement to an axial center direction], when extrapolated by said revolving shaft 4. By this example, the rod 19A of the attitude implement 19 which is extended to an axial center direction and which is an air cylinder etc., for example is connected with the other end (drawing 2 right side end) of this sliding fuse-tube 11, and the operation metal fittings 10 can move to the sliding fuse-tube 11 and one by movement of this rod 19A.

[0023] Next, said acute angle corner section [in / as said belt segment 2 is shown in drawing 1 and 3 / the raw belt material b] b1, It is constituted including a pair of wide belt segments 2A which receive said obtuse angle corner section b2, respectively, and the belt segment 2B of the narrow width allotted among said wide belt segments 2A and 2A.

[0024] In this example, the belt segments 2B of said narrow width are the former and this architecture, and as shown in drawing 4 (A) and (B), they are cutting in the radial inner surface of the abbreviation rectangle-like body part 24 the fitting slot 25 which carries out positioning anchoring of said slide metal fittings 5. Moreover, while the crevice 26 for magnet burial is formed, that surface is covered with the adhesive bond e with which it fills up in a crevice 26 by the outside surface 2S, and the magnet c1 laid underground in this crevice 26 is fixed to it by it.

[0025] [in addition, the Reason for laying a magnet c1 under the outside surface 2S in the belt segment 2B of a narrow width] It is because said fitting slot 25 will become obstructive, it becomes impossible to attach only a narrow magnet and the adsorption range will be remarkably narrowed, if it is going to lay a magnet under the inner surface.

[0026] As usual, the belt segment 2B of this narrow width is arranged in the direction of a periphery at equal intervals, and has illustrated the case where it is allotted by angle pitch alpha (shown in drawing 1) whose belt segment 2B of a narrow width is 10 degrees, by this example.

[0027] Moreover, the wide belt segment 2A is equipped with the wide body part 29 which installed the aerofoil part 29B in the both sides of the center section 29A equivalent to said body part 24 as shown in drawing 5 (A) and (B). The fitting slot 25 which carries out positioning anchoring of said slide metal fittings 5 is similarly cut in the inner surface of said center section 29A.

[0028] Moreover, the crevices 30A and 30B for magnet burial are formed in the groove bottom of this fitting slot 25, and the inner surface of said **** 29B. Although the case where a magnet c2 is laid under the cross direction by two rows is illustrated by the aerofoil part 29B in this example, you may lay one wide magnet underground. Moreover, although it is narrowness, since the magnet c2 of the aerofoil part 29B adjoins, as for the magnet c3 laid under the center section 29A, the adsorption range large as a whole is secured from the magnet c1 of said belt segment 2B.

[0029] Since the wide belt segment 2A is used, also when [thus,] the amount of diameter

expansion becomes large and the interval d of a belt segment spreads. The position gap by that the acute angle corner section b1 in the raw belt material b overflows on this wide belt segment 2A, and falls in said interval d or poor adsorption of a corner section b1 etc. can be controlled. As a result, the birth of a joint stagger mentioned above, accuracy lowering of joint inspection, etc. can be controlled.

[0030] [the width WA of said wide belt segment 2A] from such a viewpoint. Although the larger possible one is desirable, if too conversely large, in the case of diameter expansion, the belt segment 2A and the interval d between 2B will become large too much unevenly as compared with the belt segment 2B and the interval d between 2B, and will serve as a tendency which spoils the uniformity of the raw belt B. Therefore, as for the width WA of the wide belt segment 2A, it is desirable that it is 1.5 to 3.0 times the width WB of the belt segment of a narrow width.

[0031] In addition, although other wide belt segments 2A may be made intermingled further in addition to a pair of these wide belt segments 2A, it is desirable not to add in order to raise the perfect circle nature of the belt die surface S.

[0032] Moreover, in the wide belt segment 2A, since a magnet c2 and c3 are laid under the inner surface, an outside surface 2A does not have irregularity, it is smooth, therefore the detection accuracy of the measurement accuracy of the height variation rate by the laser displacement meter in the case of joint inspection or Point bf, and the termination part br can be raised.

[0033] Moreover, in a laser displacement meter, since the height variation rate is measured by reflection of light, there is a possibility of incorrect-measuring a reflective surface being silver-like metal color. Therefore, in this example, black surface preparation was carried out to the outside surface 2S of said wide belt segment 2A, and incorrect measurement is prevented on it. Alumite, Teflon (registered trademark) processing, etc. are raised as such surface preparation. In addition, in the former, since the adhesive bond was exposed to the surface, also when surface preparation was carried out, it became nonuniformity and incorrect measurement was not fully able to be prevented.

[0034] As mentioned above, although especially the desirable embodiment of this invention was explained in full detail, without being limited to the embodiment of a graphic display, it changes into various modes and this invention can be carried out.

[0035]

[Effect of the Invention] Like the above statement, this invention allots a wide belt segment to each position of the corner section of the shape of the point of a sword in the point of raw belt material, and an obtuse angle corner section, and, moreover, is carrying out ** arrival of the magnet to the inner surface of this wide belt segment in it. Therefore, birth of the joint stagger at the time of carrying out the fastener of the point and termination part of raw belt material, accuracy lowering of joint inspection, etc. can be controlled.

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view of the direction of a periphery which sketches the belt form drum of one work example of this invention.

[Drawing 2] It is the sectional view of the axial center direction including the revolving-shaft alignment J of a belt form drum.

[Drawing 3] It is the development view which develops and sketches the arrangement of a belt segment at a flat surface.

[Drawing 4] (A) and (B) are the perspective view showing the belt segment of a narrow width, and a cross direction sectional view.

[Drawing 5] (A) and (B) are the perspective view showing a wide belt segment, and a cross direction sectional view.

[Drawing 6] It is the top view which sketches raw belt material.

[Drawing 7] They are the sectional view of the direction of a periphery in which (A) shows the conventional belt form drum, and the development view which (B) develops the arrangement of the belt segment at a flat surface, and is sketched.

[Drawing 8] It is the sectional view which illustrates one of the conventional problems.

[Explanations of letters or numerals]

2A A wide belt segment

2B The belt segment of a narrow width

b Raw belt material

bf Point

br Termination part

b1 Acute angle corner section

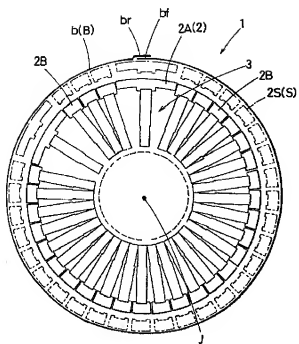
b2 Obtuse angle corner section

B Raw belt

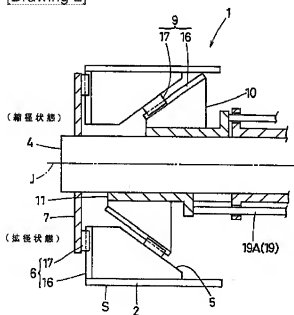
c2, c3 Magnet

S Belt die surface

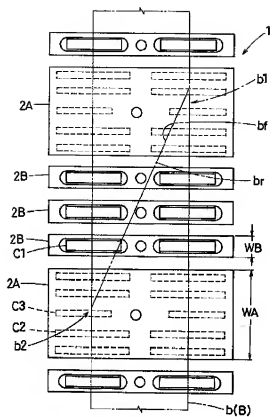
[Drawing 1]



[Drawing 2]

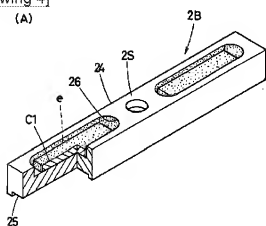


[Drawing 3]

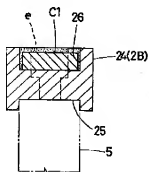


[Drawing 4]

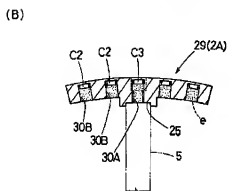
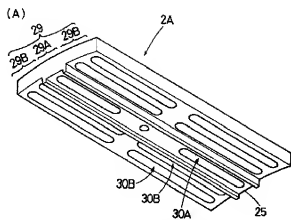
(A)



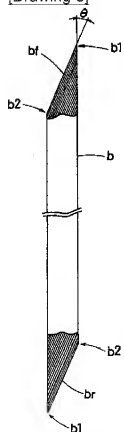
(B)



[Drawing 5]

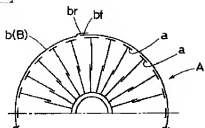


[Drawing 6]

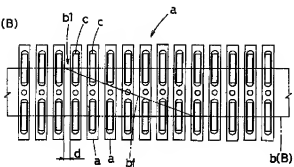


[Drawing 7]

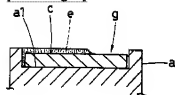
(A)



(B)



[Drawing 8]



[Translation done.]